ORIGINAL

Maryland Department of the Environment
Environmental Restoration and Redevelopment Program
1800 Washington Blvd.
Baltimore, MD 21230

MDE ERRP

BROWNFIELDS

Sampling and Analysis Plan

Baltimore American Ice Co.
2100 W. Franklin Street

May 16, 2005

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Brownfields Sampling and Analysis Plan

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May 16, 2005

Cooperative Agreement Recipient:_____
Signature

_____
Printed Name/Date

Project QA Officer:_____
Signature

_____
Printed Name/Date

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PLEASE NOTE:

This Site-Specific Sampling and Analysis Plan is a companion document to the Quality Assurance Project Plan for Maryland Department of the Environment (MDE). All of the policies and procedures specified in the MDE Quality Assurance Project Plan will be followed for this project.

PROJECT MANAGEMENT

A1 SITE INFORMATION/BACKGROUND

The Baltimore Development Corporation (BDC) is proposing to redevelop the former Baltimore American Ice Company (American Ice) property located in Baltimore City, Maryland. BDC's plan calls for reincorporating the abandoned property into the Baltimore economic community.

The American Ice property is located in the 2100 Block of West Franklin Street in the Rosemont section of Baltimore, Maryland. Rosemont is located on the western edge of the south central portion of the City of Baltimore, Maryland in the Gwynns Falls drainage basin (Figure 1). The property consists of one lot measuring 3.6 acres. The property is vacant and exhibits signs of vandalism. Geographic coordinates for the site are 39°17'37.67" N latitude and 76°39'7.53" E Longitude. Maryland geographic grid coordinates are 898 800 East and 530 700 North.

The key features characterizing the American Ice property include an office building located at 2100 West Franklin Street and a one-story low brick structure which defines the West Franklin Street frontage. Figure 2 on page 20 of this report places the site features in their geographic context.

A1.1 Site Location

American Ice is located in the westernmost edge of south central Baltimore on the north side of Franklin Avenue, between North Pulaski Street and the Amtrak Railroad right-of-way. The majority of the property is covered by warehouses; the remainder is either asphalt or gravel covered parking/storage lots.

A1.2 Site History

Historic records indicate a uniform use of these parcels dating back through the early-20th century. Sanborn Fire Insurance maps from 1914 through 1953 detail an ice company and coal bins occupying the property. Sanborn does not provide details of the area in their pre-1914 maps; the area is noted as being outside the Baltimore City fire response area.

The American Ice property is being acquired by the City of Baltimore through the BDC under the Rosemont Urban Renewal Plan. The plan is designed, among other things, to encourage new business activity in under-utilized properties.

A1.3 Site Characterization

Soft, unconsolidated, easily eroded sediments of the Patuxent Formation underlie much of the area of Baltimore east of the Fall Line. The Patuxent, however, rests upon the Baltimore Gneiss, a crystalline bedrock of late Precambrian age; the Baltimore Gneiss outcrops in the Rosemont area and the building foundation may rest on this outcrop.

The property is fairly level and all runoff from the site either flows overland to Gwynns Falls or through storm drains to Gwynns Falls and the Patapsco River.

The generalized direction of flow of the localized water table follows the contours of the land and is towards the southeast and the Patapsco River basin.

Virtually all of the residents around Baltimore City receive water from municipal supplies. These consist of ten surface water reservoirs in the vicinity of Baltimore City, the nearest of which is approximately ten miles north of the site, and a series of municipal well systems located in Anne Arundel County. No residential wells exist within a ½-mile radius of the site (MDE Well Database).

A1.4 Potential Contamination and Exposure Pathways

The pathways of concern for any residual contamination are soil and groundwater.

Industrial activity throughout the last century may have impacted portions of the Rosemont site. Based upon site visits and a review of available historical information, MDE considers several potentially contaminated areas to be possible release points or source areas that will need to be investigated. These areas include:

- The Baltimore American Ice Company – operated a ice plant on the site from 1914 through the late 1990s.

- Automotive Sales and Service Shop – operated in a building immediately upgradient of American Ice and there is a possibility that their operations may have impacted area groundwater.

- B&O Railroad – The western edge of the property is an active railroad right-of-way and the northern edge of the property was at one time a railroad siding.

A2 PROJECT DESCRIPTION

The soils (surface and subsurface) and groundwater on the American Ice site will be sampled to determine the nature of potential contamination focusing on contaminants that might be associated with the ice manufacturing, automotive repair, and railroad industries including caustic materials, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs) and pesticides and herbicides.

Surface water in the vicinity of the American Ice site is either intermittent or flows through the Baltimore City storm drain system and is not considered to be a pathway of concern. Surface water in the vicinity of American Ice will not be sampled.

A list of potentially contaminated areas was developed from a review of historic Sanborn Fire Insurance Maps, a review of prior engineering reports for the site, a review of the City of Baltimore's file on the area and a site visit. The potentially contaminated areas were identified

based on former locations where hazardous substances, hazardous wastes, or pollutants were known or suspected to have been discharged, handled, or disposed, or where hazardous substances, hazardous wastes, or pollutants may have migrated. The following contaminants of concern were identified:

- Caustic Compounds – In the early days of ice manufacture, ammonia was used as a refrigerant.
- VOCs – Due to the historic use and disposal of industrial degreasers in the automotive repair industry, volatile organic compounds are anticipated in subsurface soils throughout the area.
- SVOCs – Due to historic use of coal and wood-fired burners, and railroad operations adjacent to the property, there could be polycyclic aromatic hydrocarbon contamination in subsurface soils in the manufacturing areas. Additionally, buildings on the site were recently involved in a fire.
- PCBs – PCBs may be present in the area adjacent to the rail siding and electrical transmission areas and run-off pathways.
- Pesticides/herbicides – These contaminants may be residuals from pest and weed control applications in the area of the railroad siding.

Applicable or Relevant and Appropriate Standards, and proposed action levels are discussed in the EPA-approved MDE quality assurance project plan (QAPP).

A3 PROJECT TIME LINE

The progress of the project will be tracked from its inception through implementation to ensure all sampling and analytical activities are performed in a correct and cost effective manner.

Each step in this process will be scheduled in an objective and realistic time frame to assure that adequate attention is devoted to the minimization of effort and the maximization of information. Table I provides a proposed project time line for this project.

A4 MEASUREMENT QUALITY INDICATORS

Measurement quality indicators for this project are listed in Table II and discussed in detail in the EPA-approved MDE QAPP.

MEASUREMENT/DATA ACQUISITION

B1 SAMPLING DESIGN

This section discusses the methodology used to determine areas where environmental sampling is proposed. Table III presents a summary of the proposed analytical parameters and numbers of samples to be collected for each of the areas. Figures 2 and 3 show the proposed sampling locations on an aerial photograph of the site and a site sketch respectively.

The potentially contaminated areas identified for the facility will be investigated in accordance with MDE's Standard Operating Procedures and the EPA-approved MDE QAPP. The general approach will be to collect environmental samples from soil and groundwater from the areas identified; submit the groundwater samples to a fixed laboratory for analysis; perform field screening analyses on all soil samples and based on elevations detected in the field screening data, submit a subset of the soil samples to the fixed laboratory for detailed analysis. Should elevations in contaminants not be detected during field screening, random samples will be submitted to the fixed lab for analysis. Table IV lists a series of particular parameters which have been selected for each potentially contaminated area based on known or suspected contamination.

Twenty-two soil samples will be collected from the site. Ten from the surface layer (labeled S-#) and ten from five feet below the surface (labeled SS-#) plus one duplicate pair and one matrix spike sample. Samples will be collected from predefined areas in order to best assess potential contamination from the suspected areas of concern (AOC).

Sample S/SS-01, the matrix spike sample, will be collected from the northwestern edge of the property at the edge of the railroad siding. Sample S/SS-02 will be collected from the north-central edge of the property in the area of the old railroad trestle. Sample S/SS-03 will be collected from the northeast corner of the property in the area of the railroad trestle. Samples S/SS-04 will be collected from the area of the facility's aboveground storage tanks (AST). Samples S/SS-05 will be collected downgradient of the AST, between the AST and the office building. Samples S/SS-06 will be collected from the entrance to the site. Samples S/SS-07 will be collected from the center of the old icehouse. Samples S/SS-08 and its duplicate S/SS-11 will be collected from the open area between the icehouse, the tank house, and the shop area. Sample S/SS-09 will be collected in the area northwest of the boiler room. Samples S/SS-10 will be collected from the boiler room. As stated in the preface, all samples will be collected in accordance with MDE guidelines as documented in the QAPP.

The soil samples will be screened at MDE by X-ray fluorescence (XRF) for metals, and by immunoassay techniques for carcinogenic polycyclic aromatic hydrocarbons (cPAHs), and PCBs. Subsurface soil samples will also be screened for the presence of VOCs by gas chromatograph/mass spectrometer (GC/MS). A subset of samples based on detections in field screening data will then be submitted to the fixed laboratory for confirmatory analysis. If there are no detections in the field screening data, the samples will be selected at random to submit to the fixed laboratory. The data from the fixed laboratory analyses will be used by an MDE toxicologist to prepare a toxicological evaluation assuming a future commercial use scenario.

All samples will be compared to MDE's Nonresidential Cleanup Standards. If total chromium is detected in the soil samples exceeding MDE's Cleanup Standards, then the two samples that contain the highest concentrations for chromium will be speciated for hexavalent chromium (Cr VI) and trivalent chromium (Cr III). If mercury is detected in soil samples exceeding MDE's Cleanup Standards, inorganic elemental mercury will be differentiated in two of the samples that have the highest field screened concentrations.

Soil borings will be advanced at all soil sampling locations. Soil sampling is proposed as described in Table IV and shown in Figure 2. Borings will be advanced in four foot intervals using a standard Geoprobe rig and a continuous soil profile will be obtained down to eight feet below surface or refusal whichever is shallowest. Geologic classification and field screening and observations will be noted for each four-foot core. Grab samples will be obtained from the top one-foot of each four-foot core section. Soil samples will be collected on the City-owned property located south of Franklin Avenue, and east of Bentalou Street. The sample locations are described in Table IV and shown in Figures 2 and 3.

Surface water sampling is not proposed for this project. One groundwater sample will be collected from a temporary wells installed in the center of the study area. The groundwater sample will be designated GW-1 and will be collected from a temporary well installed in the Geoprobe boring at S/SS-8. GW-2 will be a duplicate sample of GW-1.

The aqueous sample matrix will have appropriate quality control (QC) samples collected and submitted in accordance with the procedures outlined in the EPA approved MDE QAPP. These QC samples will include field and trip blanks, rinsate blanks and matrix spikes where appropriate.

Subsequent to completion of all fieldwork and receipt of laboratory analytical results, a Brownfields Assessment Report will be prepared presenting and discussing the information obtained during execution of this work plan. The report will present the following:

- Summarized historical information;
- Physical setting;
- Technical overview with a general profile of the Brownfields Assessment investigation execution and results;
- Toxicological evaluation prepared by an MDE toxicologist;
- Findings and recommendations;
- Results of all analyses, copies of all laboratory and field data sheets, and the required laboratory data deliverables;
- A summary of analytical methods and quality assurance indicators;
- Tables summarizing all sampling results, including sample locations, media, sample depth, field and laboratory identification numbers, analytical results, and comparison to the State of Maryland, Department of the Environment, Cleanup Standards for Soil and Groundwater, August 2001 (interim final guidance);

- Stratigraphic logs and soil boring records (including state permit numbers, if applicable), which include physical characteristics of the soil and field instrument readings detected during drilling for each soil boring;
- Stratigraphic cross-sections, if applicable;
- Sample location maps; and
- Other information obtained during the assessment.

B2 SAMPLING METHODS REQUIREMENTS

Table III provides information about the sampling procedures that will be used for this project. For specific details about the sampling procedures referenced in Table III, refer to the appropriate section of the QAPP. All samples will be collected and preserved in accordance with procedures found in the QAPP. Field Quality Control Requirements for this sampling activity are also described in the QAPP.

B3 ANALYTICAL METHODS REQUIREMENTS

Table III provides information about the analytical methods (including any extraction or digestion methods) being used for this project. Additional information about analytical methods requirements (MDL, PQL, etc.), laboratory quality control requirements and laboratory equipment calibration procedures can be found in the EPA-approved MDE QAPP.

DATA VALIDATION AND USABILITY

C1 RECONCILIATION WITH USER REQUIREMENTS

Please see the EPA-approved MDE QAPP for discussion of how data will be evaluated, issues resolved and limitations reported.

TABLE I- PROJECT TIME LINE

Activities	Dates *(MM/DD/YY)*	
	Activity Start Date	Activity End Date
Site Visit and Phase I Information Collection	04/27/05	04/27/05
Draft Sampling and Analysis Plan (SAP)	04/27/05	
Submit SAP for Internal Review	04/28/05	TBD
Submit SAP for EPA Review		
Receive EPA Comments on SAP		
Submit RFP for Lab Work	TBD + 1	+ 30 days
Submit RFP for Geoprobe	TBD + 1	+ 30 days
Draft Purchase Orders	TBD + 15	+ 30 days
Schedule Sample Dates	TBD + 15	+ 1 day
Soil and Groundwater Sample Collection	TBD + 45	+ 2 days
Field Screening Samples	TBD + 46	+ 2 days
Review Field Screening Data and Select Lab Samples	TBD + 47	+ 1 day
Samples Submitted to Fixed Lab for Analysis	TBD +48	+ 60 days
Third Party Validation of Laboratory Data Package	TBD + 60	+ 120 days
Review Laboratory Data Package	TBD + 180	+ 10
Draft Brownfields Report	TBD + 190	TBD + 220 days
Submit Final Report to EPA	TBD + 250	TBD + 250 days

TABLE II- MEASUREMENT QUALITY INDICATORS

Compound	Matrix	Action Limit*	Precision	Accuracy	Completeness
Arsenic	Soil	2000 µg/Kg	Field Duplicate & Matrix Spike RDP = >80%	Analysis of QC Samples Matrix Spike Recovery	Amount of Valid Data Obtained % of # of Samples
Mercury	Soil	100 µg/Kg			
Acetone	Soil	7.8 E + 05 µg/Kg			
Methylene Chloride	Soil	8.5 E + 04 µg/Kg			
Benzo(a)pyrene	Soil	780 µg/Kg			
Manganese	Water	50 µg/L			

*=MDE Cleanup Standards for Soil and Groundwater, August 2001.

TABLE III - SAMPLING AND ANALYTICAL METHODS REQUIREMENTS

Matrix	Parameter	Number of Samples	Sampling Procedure	Sample Preparation/Extraction Method Number	Analytical Method Number
Soil	Volatile Organics (VOCs)	10	Grab	3585, 5021, 75030B, 5031, 5032, 5035	EPA Method 8260B
Soil	Semi-volatile Organics	10	Grab	3510C, 3520C, 3540C, 3541, 3545, 3550B	EPA Method 8270C
Soil	Pesticides/Aroclors (PCBs)	10	Grab	3510C, 3520C, 3540C, 3541, 3545, 3550B	EPA Methods 8081/8082
Soil	Total Metals	10	Grab	3005A, 3010A, 3015, 3050B, 3051	EPA Method 6020
Soil	Cyanide	10	Grab	See analytical method	EPA Method 9010B
Soil	Elemental Mercury	2	Grab	See analytical method	EPA Method 7471A
Soil	Chromium VI	2	Grab	3060A	EPA Method 7196A
Water	Volatile Organics (VOCs)	3	Low Flow	3585, 5021, 5030B, 5031, 5032, 5035	EPA Method 8260B
Water	Semi-volatile Organics	3	Low Flow	3510C, 3520C, 3540C, 3541, 3545, 3550B	EPA Method 8270C
Water	Pesticides/Aroclors (PCBs)	3	Low Flow	3510C, 3520C, 3540C, 3541, 3545, 3550B	EPA Methods 8081A/8082
Water	Total & Dissolved Metals	3	Grab	3005A, 3010A, 3045, 3050B, 3051	EPA Method 6020

FIGURE 1 - LOCATION OF AMERICAN ICE

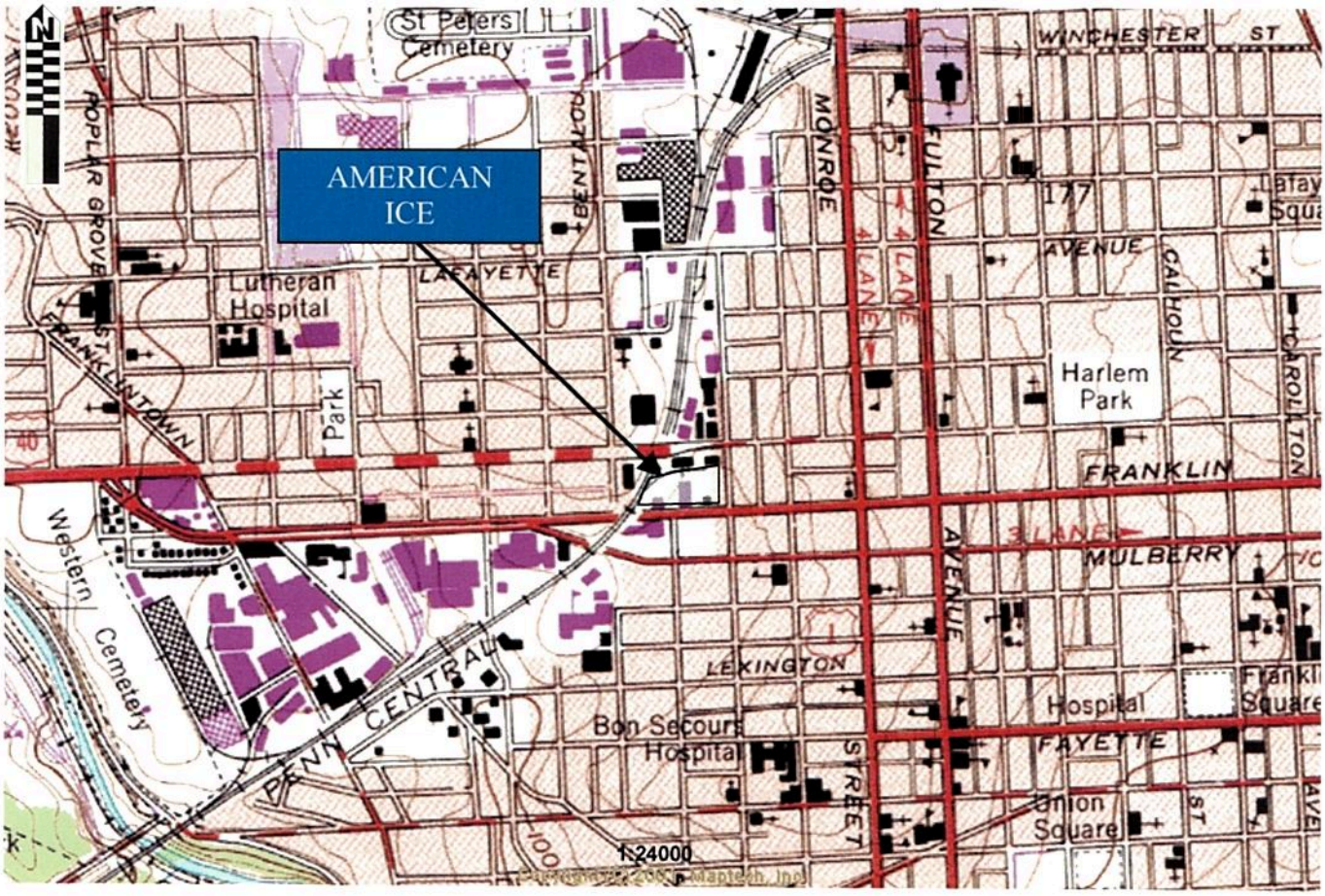
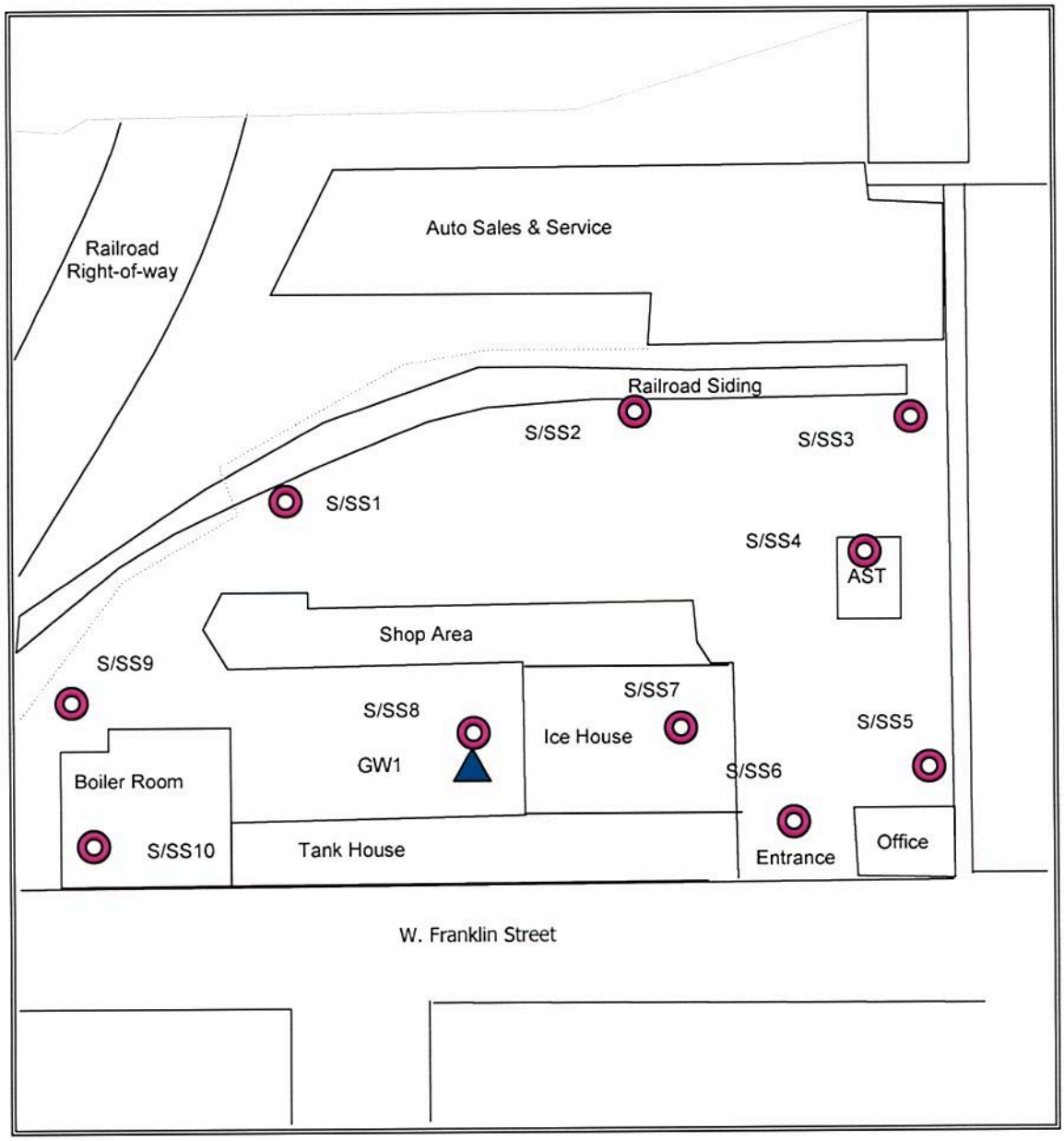


TABLE IV – PROPOSED SAMPLING SUMMARY

Sample ID	Sample Location	Sample Depth	Analytical Parameters		Rationale
			Field Screening	Fixed Laboratory	
SOIL (*subset of soil samples will go to fixed lab)					
S-1	American Ice	0-1 ft	X	X Matrix Spike	Characterize surface soil on northwestern edge of the property at the edge of the railroad siding.
SS-1	American Ice	4-5 ft	X	X Matrix Spike	Characterize subsurface soil on northwestern edge of the property at the edge of the railroad siding.
S-2	American Ice	0-1 ft	X	TBD	Characterize surface soil north-central edge of the property in the area of the old railroad trestle.
SS-2	American Ice	4-5 ft	X	TBD	Characterize subsurface soil in north-central edge of the property in the area of the old railroad trestle
S-3	American Ice	0-1 ft	X	TBD	Characterize surface soil in northeast corner of the property in the area of the railroad trestle
SS-3	American Ice	4-5 ft	X	TBD	Characterize subsurface soil in northeast corner of the property in the area of the railroad trestle
S-4	American Ice	0-1 ft	X	TBD	Characterize surface soil in the area of the facility's aboveground storage tanks
SS-4	American Ice	4-5 ft	X	TBD	Characterize subsurface soil in the area of the facility's aboveground storage tanks
S-5	American Ice	0-1 ft	X	TBD	Characterize surface soil downgradient of the AST, between the AST and the office building
SS-5	American Ice	4-5 ft	X	TBD	Characterize subsurface soil downgradient of the AST, between the AST and the office building
S-6	American Ice	0-1 ft	X	TBD	Characterize surface soil in the entrance to the site
SS-6	American Ice	4-5 ft	X	TBD	Characterize subsurface soil in the entrance to the site
S-7	American Ice	0-1 ft	X	TBD	Characterize surface soil in the center of the old icehouse.
SS-7	American Ice	4-5 ft	X	TBD	Characterize subsurface soil in the center of the old icehouse.
S-8	American Ice	0-1 ft	X	X Duplicate	Characterize surface soil inthe open area between the icehouse, the tank house, and the shop area
SS-8	American Ice	4-5 ft	X	X Duplicate	Characterize subsurface soil in open area between the icehouse, the tank house, and the shop area.
S-9	American Ice	0-1 ft	X	TBD	Characterize surface soil in the area north west of the boiler room
SS-9	American Ice	4-5 ft	X	TBD	Characterize subsurface soil in the area north west of the boiler room.
S-10	American Ice	0-1 ft	X	TBD	Characterize surface soil in the boiler room
SS-10	American Ice	4-5 ft	X	TBD	Characterize subsurface soil the boiler room
S-11	American Ice	0-1 ft	X	X Duplicate	Duplicate of S-8
SS-11	American Ice	4-5 ft	X	X Duplicate	Duplicate of SS-8

Sample ID	Sample Location	Sample Depth	Analytical Parameters		Rationale
			Field Screening	Fixed Laboratory	
Surface Water					
No Surface Water Samples Planned					
Groundwater					
GW-1	American Ice	N/A	No	X Matrix Spike	Characterize Groundwater downgradient of site at location S/SS-8
GW-2	American Ice	N/A	No	X Duplicate	Duplicate of GW-1 at location S/SS-8

FIGURE 2 – Sample Locations



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